Annals of the Natal Museum, Vol. XV, part 24, issued 29 November, 1963

Descriptions of Southern African Amphibians

By

J. C. Poynton,

Dept. of Zoology, University of Natal, Pietermaritzburg.

With Plate IV

DURING the course of preparing a revision of the Amphibia of southern Africa, some new forms have come to light, and some validly named forms have been found to require a proper description and designation of types. Illustrations of most of the species here described as new will appear in a later publication.

Bufo gariepensis inyangae n. subsp.

Types.—Holotype: an adult male in the Umtali Museum, Southern Rhodesia (UM/H 1289) collected at Inyangani Mountain (8,400 ft., 2,560 m.), Inyanga, Southern Rhodesia, by Mr. D. G. Broadley, 22.xi.1961. Paratypes: 17 males, females and juveniles (UM/H 1288, 1290–1306), bearing the same records as the holotype.

Diagnosis.—In general appearance closely resembling *Bufo gariepensis nubicola* Hewitt from the Natal Drakensberg, but differing therefrom in the relatively narrower head and longer feet, narrow parotid glands, and relatively smaller subarticular tubercles. Differing from *B. g. gariepensis* Smith in these same respects, in addition to differing from this form in the same manner as does *B. g. nubicola.*

Description of holotype.—Width of head 0·36 body length, equal to the length of the foot minus the last two phalanges of the fourth toe. Parotid glands fairly prominent, elongated, width at anterior end approximately 1/3 length. Tympanum distinct, pupil with a small dorsal umbraculum. Tarsal fold a faint glandular ridge. Length of inner metatarsal tubercle less than free portion of inner toe, outer metatarsal tubercle no larger than other plantar tubercles. Tarso-metatarsal articulation reaching tympanum. Two phalanges of outer toe free of webbing, 2½ of third toe free. Toes with almost no margin of web.

Dorsal surface moderately warty. Warts rounded, anterior warts smooth, posterior warts with minute black asperities. Throat very slightly granular, abdomen slightly granular.

Dorsal markings a coarse, asymmetrical dark olive reticulum on a light grey brown background. Abdomen with grey flecks.

Dimensions: Length from tip of snout to vent 40·4 mm, width of head 13·9 mm, length of foot (including metatarsal tubercle) 17·3 mm.

Paratypes.—In proportions the series resembles the holotype, but in the larger females the width of the head equals the length of the foot minus only

the last phalanx of the fourth toe. Dorsal markings very variable, in some cases the lighter background being almost obliterated, and in three specimens the back is a blotchy dark brown all over. Ventral surface immaculate to heavily flecked. Maximum size (female): 42·6 mm.

Other material.—Three specimens from Inyangani Mountain; 3 specimens from Chirwe/Gaeresi Ridge, Inyanga; 5 specimens from south Inyangombe headwaters, Inyanga; 1 specimen from Pungwe Gorge, Inyanga. This material agrees with the type series. The Pungwe Gorge specimen has exceptionally long toes, the width of the head being equal to the length of the foot minus $2\frac{2}{3}$ phalanges of the fourth toe. Maximum size (female): 46·3 mm.

Most of the adults of this form were collected under stones. Tadpoles, presumed to belong to this form, were found in small pools or moving across wet granite faces (cf. *B. perreti* Schiøtz, 1963, from Nigeria). *B. g. gariepensis* evidently at one time extended over Southern Rhodesia and differentiated into this montane form in the same way as *g. nubicola* has differentiated on the Drakensberg.

Bufo vertebralis grindleyi n. subsp.

Types.—Holotype: an adult male (UN 1259) deposited in the Umtali Museum, Southern Rhodesia (UM 5369), collected on the floor of the Bundi Valley, Chimanimani Mountains (at 5,300 ft., 1,560 m.), Southern Rhodesia, by Mr. J. R. Grindley, zoologist on the University of Cape Town Chimanimani Expedition, February, 1958. Paratypes: 5 females (UN 1260–1264) collected by Mr. Grindley on the Chimanimani Mountains from the localities: near Mountain Club Hut (5,600 ft., 1,710 m.); south of the Needle (5,700 ft., 1,740 m.); Uncontoured Peak (6,000 ft., 1,840 m.); near summit of Point 71(8,000 ft., 2,440 m.) (two specimens).

Diagnosis.—Closely resembling *Bufo vertebralis fenoulheti* Hewitt (of which *B. fenoulheti rhodesianus* Hewitt is considered to be a synonym), but differing therefrom in the dark ventral marbling, the absence of conspicuous light occipital and sacral patches, and the presence, in most specimens, of dentate warts on the back.

Description of holotype.—Width of head 0·38 length of body. Parotid glands elongated and very warty. Tympanum distinct. No tarsal fold. Inner and outer metatarsal tubercles subequal. Subarticular tubercles of toes double. Webbing rudimentary. Tarso-metatarsal articulation reaching eye.

Snout, top of head (except upper eyelids) and the portion of the back immediately overlying the vertebral column smooth, remainder of back generally smooth, but possessing about 40 large, more or less conical warts with additional projections near the base. Entire ventral surface granular.

Dorsal markings : more or less symmetrically placed dark patches, leaving a relatively light vertebral line, which expands and terminates in the occipital region. Chest and abdomen with dark vermiculations.

Dimensions : Length from tip of snout to vent 27·3 mm. ; width of head 10·6 mm. ; length of foot 9·5 mm.

Paratypes.—With an increase in altitude, the dorsal warts become progressively smaller, the specimens collected at 8,000 ft. having inconspicuous warts and parotid glands. The throats also become smooth. Otherwise the paratypes closely resemble the holotype. The ventral surface, however, varies from being almost immaculate to being heavily reticulated. Maximum size (female) : 32·7 mm.

Other material.—Twenty-eight specimens collected from the eastern and western ranges, and Turret Towers, of the Chimanimani Mountains by Mr. D. G. Broadley. A series of 20 specimens from Turret Towers (7,500 ft., 2,280 m.) shows considerable variation in the size of the dorsal warts, these warts being conspicuous in males, but reduced or almost absent in females. Evidently the degree of wartiness is influenced by sex as well as altitudinal differences. The specimens were breeding in shallow pools on a grass-covered face.

Breviceps acutirostris n. sp.

Types.—Holotype : a gravid female in the Albany Museum, collected on Swellendam Mountains by G. Hutchinson, 5.ii.1927. Paratypes : a female and a juvenile in the Albany Museum, bearing the same records as the holotype. All three specimens are numbered 5507.

Diagnosis.—Most closely related to *Breviceps maculatus* FitzSimons, but differing therefrom in the more sharply pointed snout, the relatively narrower interorbital space, the almost completely concealed tympanum, and the absence of lateral vertical banding. Differing most obviously from *B. verrucosus* Rapp and *B. tympanifer* Hewitt in having a conspicuous light and dark patchwork covering the entire ventral surface. Differing from all other forms of *Breviceps* in that the outer toe passes beyond the basal tubercle of the fourth toe.

Description of holotype.—Snout pointed, projecting slightly. Internarial distance slightly greater than distance between nostril and eye ; interorbital distance subequal to breadth of upper eyelid (much greater than breadth of upper eyelid in *maculatus*), less than horizontal diameter of eyes. Diameter of eye going about 12 times into length of body. Tympanum faintly distinguishable on right side, invisible on left side.

Fingers short, first very slightly shorter than second, fourth reaching distal subarticular tubercle of third, and nearly as long as second. Outer toe extending well beyond basal tubercle of fourth, reaching further than second ; inner

toe smallest. Inner metatarsal tubercle somewhat smaller than in *maculatus*, but larger than outer.

Skin above covered with porous warty granules, but not as closely spaced as in *maculatus*. Lower surfaces granular throughout, granules on the chin and throat smaller than those more posteriorly, where they are much more flattened.

Colour (in alcohol): Above, warts dark brown, between which the skin is creamish to light brown. Otherwise completely uniform, with no black markings. Below, a patchwork of creamy white and light brown over entire ventral surface.

Dimensions: Tip of snout to vent 40·3 mm.; horizontal diameter of eye 3·2 mm., length of foot 11·9 mm., breadth of foot 5·9 mm.

Paratypes.—The tympanum is not visible in the paratype female, but is distinct on both sides of the juvenile. The juvenile has a few incipient longitudinal glandular ridges down the back, recalling the appearance of some *maculatus* and *verrucosus* specimens. Dimensions: female, snout to vent 40·9 mm.; juvenile, 18·4 mm.

Other material.—A recently-collected 16·7 mm. specimen from Grootvadersbos, near Swellendam, in the Kruger Park collection, shows ten very irregular longitudinal series of dark blotches on the back and sides. It appears that these markings are soon lost during growth, as they are barely discernable on the not-too-faded juvenile paratype. Also a single specimen in the South African Museum (13945) from Hottentots Holland Mountains.

Breviceps sylvestris taeniatus n. subsp.

Type.—Holotype an adult female in the Transvaal Museum (TM 25321), collected near Mara, summit of the Soutpansberg (about 15 miles west of Louis Trichardt), Transvaal, by J. Bentley, April, 1958.

Diagnosis.—Morphologically similar to *Breviceps sylvestris* FitzSimons, but differing therefrom in the non-convergence of the pair of dorsal skin ridges, and in the possession of a series of black lines on the back.

Description of holotype.—Snout short, hardly projecting. Internarial distance subequal to distance between eye and nostril; interorbital width subequal to breadth of upper eyelid, equal to about half horizontal diameter of eyes. Diameter of eye going about 11 times into length of body. Tympanum hidden.

First finger slightly shorter than second, fourth just reaching distal subarticular tubercle of third, less than $\frac{3}{4}$ length of second. Outer toe reaching basal tubercle of fourth, reaching as far as second; inner toe smallest. Outer metatarsal tubercle relatively smaller than in *sylvestris* FitzSimons, about half the length of the inner tubercle.

Dorsal skin covered with small, porous, warty granules. A fairly distinct glandular ridge present on either side, running in an almost straight line from the posterior corner of the eye to the sacral region, and not converging markedly as in *sylvestris*.

Ventral surfaces granular throughout; granules on the chin and throat smaller than those posteriorly, although in this specimen the skin is tightly stretched, making them inconspicuous.

Colour (in alcohol). Above, ground colour a light brown, with four pairs of short, thick, irregular black transverse lines lying symmetrically in series down the back, pointing obliquely backwards and extending laterally as far as the glandular ridges. Anterior part of glandular ridge also with black markings, which, with markings on the occipital region, outline a lighter pair of elongated patches in the scapular region, whose posterior border is marked by the first pair of transverse lines. Also irregular black markings present on either side of the urostyle. A dark brown band commencing from below each eye, broadening out infero-posteriorly, and running into the ventral marbling, but region around angle of jaw light-coloured. Flanks with irregular dark brown stripes.

Below, irregular brown marblings on a cream background. The brown of the lateral and ventral surfaces of this form is much lighter than the brown shown in *sylvestris*.

Dimensions: Tip of snout to vent 42·8 mm.; horizontal diameter of eye 4 mm.; length of foot 13·2 mm.; breadth of foot 6·6 mm.

Other material.—A gravid female (43·9 mm.) in the Albany Museum (No. 5585) collected near Louis Trichardt; four juveniles (25·0 to 21·9 mm.) in the Transvaal Museum (TM 26035–26038), collected at Rotumba, on the lower slopes of the Soutpansberg, about 20 miles west of Louis Trichardt. The black dorsal marking is heavier in the female than in the holotype, but in the juveniles the black markings are largely confined to the pair of glandular ridges. These ridges are rather more pronounced in juveniles than in adults.

B. sylvestris FitzSimons is known from the Woodbush area, about 50 miles south of the Soutpansberg. It is likely that these two forms approach each other both geographically and morphologically in the intervening area.

Cacosternum nanum parvum n. subsp.

Types.—Holotype: an adult male deposited in the Natal Museum (NM 1146), collected at Mooi River, Natal, by Mr. John Vincent, December, 1958. Paratypes: six adult males in the Dept. of Zoology, Natal University (UN 2451–2456), bearing the same data as the type.

Diagnosis.—Closely related to *C. nanum* Boulenger (of which *C. boettgeri albiventer* Hewitt is considered a synonym), but differing therefrom in the smaller size, smaller interorbital distance, and more fully pigmented throat.

Description of holotype.—Procoracoid bar cartilaginous, developed to more than half way from scapular end. Metasternum bony and slender, length subequal to ventral symphysis of coracoids. Ventral edges of coracoids entire.

Width of head 0·35 times body length. Horizontal diameter of eye greater than interorbital distance, greater than distance from eye to nostril. Interorbital distance subequal to width of upper eyelid. Canthus rostralis rounded, tympanum hidden.

Tarso-metatarsal articulation reaching eye. Inner metatarsal tubercle small, rounded; outer metatarsal tubercle minute. Palmar tubercles well developed. A flat anal-sacral gland present, as in *nanum* Boulenger.

Colour (in alcohol). Above, a dark olive ground, with some darker flecks on the anal-sacral gland. A fine, light vertebral line present. Below, throat grey all over, but a faint lighter network visible. Anterior half of gular region a very dark grey. Belly mottled with irregular, light grey patches.

Dimensions: This form falls into the same size range as *Microbatrachella capensis* (Boulenger). Tip of snout to vent 15·5 mm., width of head 5·3 mm.

Paratypes.—The length ranges from 15·7 to 14·3 mm. There is no doubt that this series represents the adult of this form, as all have well developed testes (very heavily pigmented and morulated, as is typical of *Cacosternum*), and were calling when collected.

Other material.—Thirty-four specimens from Woodbush, Haenertsburg, and Lydenburg (Transvaal Museum); Sabie, nr. Barberton; Van Reenen, the Natal Drakensberg and Matatiele (Natal University collection).

This form appears to merit only subspecific recognition, as it does not seem to be sympatric with the very closely related *nanum* Boulenger. It appears to be a more temperate form of *nanum*, being separated from it roughly along the line of the 13° C. July isotherm, a line across which many zoogeographical changes occur.

Nothophryne n. genus

A series of nine frogs recently collected by Mr. D. G. Broadley on Mt. Mlanje, Nyasaland, does not appear to belong to any known genus. A new genus, *Nothophryne*, is here erected to contain this material, the type-species of this genus being *N. broadleyi* n. sp., described below. Three of these specimens have been stained with alizarin and cleared.

Description.—Vertebral column diplasiocoelous, sacral diapophyses slightly expanded. Sternum firmisternous, episternum and ossified omosternum present, omosternum entire posteriorly. Procoracoid bars not ossified, straight and transversely arranged. Coracoids lying almost transversely, not notched medially. Metasternum ossified, about twice as long as broad. Maxillary and premaxillary teeth present, vomerine teeth absent. Premaxilla with a deep

posterior notch, vomers with no long median process. Distal phalanges not expanded.

Body depressed. Tongue with a well developed median papilla. No tarsal tubercle; subarticular tubercles weakly developed. No webbing. Eggs (in ovaries, not seen laid) relatively small and darkly pigmented.

Diagnosis.—In general appearance, the specimens show the closest resemblances to *Cacosternum capense* Hewitt, although the limbs are longer. But the presence of an episternum and an ossified omosternum excludes the material from *Cacosternum*. In general skeletal structure, the material shows some resemblance to *Anhydrophryne*, but the omosternum is more strongly ossified, and the coracoids are not broadly expanded, but are similar to those of *Cacosternum*. Although there are no mature males in the series, there is no indication of strong ethmoidal ossification to produce a digging snout, as in *Anhydrophryne*. Furthermore, the ovaries contain relatively small eggs. The new material differs even further from *Arthroleptella*, which is closely related to *Anhydrophryne*, on account of the long metasternum in *Arthroleptella*.

The presence of a lingual papilla suggests a relationship with *Phrynobatrachus*, but the material lacks the tarsal tubercle of that genus, and the toes are not webbed. The procoracoid bar is not ossified, and in general appearance the material is quite unlike *Phrynobatrachus*. The series presents a rather unexpected conglomeration of characters shown in a number of closely related genera, notably the external appearance of *Cacosternum capense*, a skeleton recalling *Anhydrophryne*, and a lingual papilla like that found in *Phrynobatrachus*. It is therefore placed in a new genus, and the odd assortment of characters gives the genus its name (Gk. *nothus* = mongrel).

Discussion.—The phylogenetic position of this new genus is not altogether clear. It evidently belongs to the Cacosterninae of Laurent (1961), and it could be regarded as coming close to a primitive form of *Cacosternum*. However, *Microbatrachella* comes even closer to being a primitive *Cacosternum*, yet *Microbatrachella* and *Nothophryne* differ widely. Externally, *Microbatrachella* resembles *C. boettgeri* very closely, being distinguishable only by the presence of webbing and a slightly more slender build. It possesses a very reduced and barely ossified omosternum and a partially ossified procoracoid bar. These features can all be taken as being primitive with respect to *boettgeri*, and it resembles *boettgeri* in having a long metasternum. In all these features it differs from *Nothophryne*. *Nothophryne* resembles *C. capense* most closely, and this suggests that *Cacosternum* as at present recognized is diphyletic, *capense* being derived from a " *Nothophryne* line ", and *boettgeri* from a " *Microbatrachella* line ". The very close interrelationships within the genus *Cacosternum*, however, argue against such a possibility. It seems more likely that *Nothophryne* is an isolated relic of the pre-*Cacosternum* stock, representing the " *capense* " extreme in the variation of that stock.

The lingual papilla of *Nothophryne* could be a primitive feature with respect to *Cacosternum*, since all species of *Cacosternum* possess a more or less distinct nick in the tongue in the position corresponding to the recess that bears the papilla in *Nothophryne*. This feature, however, is not shown in *Microbatrachella*. Whether the lingual papilla in *Phrynobatrachus* and in *Nothophryne* are phylogenetically linked, or are due to parallelism, is a question that does not seem answerable at present, but the second alternative seems to be the more likely one.

Nothophryne broadleyi n. sp. Plate IV

Types.—Holotype : a young but gravid female in the Umtali Museum (UM 4331) collected at Dzole (8,900 ft. = c. 2,715 m.), Mount Mlanje, Nyasaland, by Mr. D. G. Broadley, 24.xii.62. Paratypes : 8 half-grown and juvenile specimens (UM 4332–4336), bearing the same records as the holotype.

Diagnosis.—See diagnosis and discussion of generic characters.

Description of holotype.—Tibio-tarsal articulation of adpressed hind limb reaching eye ; distance from this articulation to end of foot equal to distance from tip of urostyle to tympanum. Tympanum just discernible, horizontal diameter slightly less than half diameter of eye.

Dorsal skin with numerous rounded or elongated glandular swellings. A prominent light interocular bar present, bounded anteriorly and posteriorly by heavy dark bands. A dark X present over the scapular region, similar to *Cacosternum capense* ; also a pair of longitudinally elongated dark rings on the sacral region. Most of dorsal surface a pinkish grey (in alcohol). Legs with prominent transverse banding. Throat and abdomen with scattered, irregularly-shaped dark brown blotches on a cream ground.

Dimensions : Distance from tip of snout to vent 27·4 mm. The specimen is probably not fully grown, as a 25·6 mm. paratype, which has been stained with alizarin and cleared, shows almost no ossification of the carpal region, and separate epiphyses. Width of head 10·8 mm. Length of hind limb 42·5 mm.

Paratypes.—These resemble the holotype closely, but one specimen has a prominent light line running from the tip of the snout to the vent. The amount of ventral blotching is very variable, ranging from a few small spots on the pectoral region to large, irregular patches covering most of the throat and abdomen.

Dimensions : The length ranges from 25·6 to 18·2 mm.

According to Mr. Broadley (in litt.), the series was collected right on the summit of Mlanje, under stones.

N. broadleyi is the type-species of *Nothophryne* by monotypy.

Arthroleptis troglodytes n. sp.

Types.—Holotype : a gravid female in the Umtali Museum (UM 3730), collected by Mr. D. G. Broadley, November 1962, on the Western Chimanimani Mountains, Southern Rhodesia, at about 5,500 ft. (1,675 m.). Paratypes : 14 adults and half-grown specimens (UM 3731–3739) bearing the same data.

Diagnosis.—In general structure very similar to *A. wahlbergi* Smith, but the toes are slightly longer, lying at the extreme and beyond the range of variation in *wahlbergi*, and the subarticular tubercles are less developed, not forming conical projections. Differing mainly in the dorsal colour pattern, there being no conspicuous dark patch above each groin, and the typical *Arthroleptis* pattern tends to be broken up by mottling and other irregularities.

Description of holotype.—Maxillary teeth well developed. Interorbital distance 0·22 of width of head. Length of inner metatarsal tubercle 0·1 tibia length, less than length of inner toe, oval in outline and flattened. Subarticular tubercles weakly developed, not conical. First finger slightly shorter than second. Tips of fingers and toes slightly swollen, but swelling not wider than width of subarticular tubercles. Omosternum widely forked, coracoids simple. Tibio-tarsal articulation reaching eye.

Dorsal markings : anterior part of head light with slight dark speckling, remainder of surface mainly a dark brown, the markings being basically of the *Arthroleptis* type, but not regular in outline or fully symmetrical, and partly obscured by other irregular dark patches. Legs and arms strongly banded.

Dimensions : Length from snout tip to vent 24·1 mm., width of head 7·4 mm., length of hind limb 34·4 mm., length of foot (*i.e.*, including metatarsal tubercle) 10·9 mm.

Paratypes.—Length of foot/length of body 0·47 to 0·52 mm. A fairly typical *Arthroleptis* pattern is shown by some specimens, but in most the pattern is disrupted and obscured as in the holotype, to the extent of being unrecognizable as an *Arthroleptis* pattern unless compared with intermediate specimens. Otherwise the paratypes agree with the holotype. In males the first finger is slightly less than half the length of the third. Maximum size (female) : 25·3 mm.

Other material.—A 26·4 female in the Umtali Museum collected at the type locality in October, 1961.

The specimens were collected from under stones or in caves, but not one was collected in forest. According to Mr. Broadley, the only *Arthroleptis* in the patches of forest in the type area is *xenodactyloides* Hewitt. *A. wahlbergi* is strictly a forest form, and although *troglodytes* is structurally very similar to *wahlbergi*, the marked difference in ecology indicates a specific rather than a subspecific distinction. The apt name of *troglodytes* (one that creeps into holes) was suggested by Mr. Broadley.

Leptopelis xenodactylus n. sp.

Type.—Holotype a gravid female (UN 4163) deposited in the Natal Museum (NM 1147), collected at Underberg at about 5,200 ft., (1,590 m.), Natal, by L. Franklin, March 1961.

Diagnosis.—A species resembling *L. flavomaculatus* Günther more closely than any other *Leptopelis*, but differing therefrom in the absence of expanded digital discs and relatively shorter webbing. Differing markedly from *L. natalensis* Smith in the possession of a massive inner metatarsal tubercle, much longer hands and feet, absence of expanded digital discs, and relatively shorter webbing.

Description.—Internarial distance less than interorbital distance. Tibio-tarsal articulation reaching tympanum. Distance from nostril to tympanum approximately $\frac{1}{3}$ length of foot, length of hand equal to intertympanic distance. Tips of fingers and toes flattened, but not broader than the proximal parts of the digits. Length of inner metatarsal tubercle equal to length of inner toe. Webbing (except margin) only present at base of fingers ; not reaching middle subarticular tubercle of fourth toe on either side, reaching distal tubercle on outer toe.

Dorsal surface a completely uniform green. Ventral surface immaculate.

Dimensions : Distance from tip of snout to vent 52·2 mm., width of head 19·8 mm. Length of foot 29·5 mm., length of hand 16·6 mm.

This species has proved to be as elusive as another new Natal uplands form, *Rana wageri*, which for a long time was known from only one specimen. While it is normally undesirable to base a species on a single specimen, the present specimen is so distinctive that there is no possibility of its belonging to any previously known species. Moreover, its morphological peculiarities make perfectly good ecological sense. The long fingers and toes, which lack expanded discs, are evidently an adaptation to living in the grassy marshes of the upper eastern plateau slopes. Similar features are shown by *Kassina wealii* Boulenger, which is a grass-climbing species occurring in the same area.

The presence of ripe eggs in March suggests autumnal or winter breeding. According to a local African game guard, the frog only appears after the height of summer, and indeed legend has it that during the summer this frog turns into a bird.

Hyperolius marmoratus broadleyi n. subsp.

Rappia marmorata Hewitt and Power, 1913 (not Rapp), *Trans. roy. Soc. S. Afr.*, **3**, p. 170.
Hyperolius marmoratus FitzSimons, 1958 (not Rapp), *Occ. Pap. nat. Mus. S. Rhodesia*, **22***b*, p. 211.

Types.—Holotype : an adult female (UN 3301) deposited in the Umtali Museum, Southern Rhodesia (UM 5370), collected at Umtali by the Natal University Nyasaland-Mozambique Expedition, January 31, 1959. Paratypes : 32 adults in the Department of Zoology, Natal University (UN 3302–3315, 3318–3335), bearing the same data as the holotype.

Diagnosis.—Closely resembling *H. parallelus* Günther and *H. albofasciatus* Hoffman, but differing from the former in the possession of red lines in the white bands and streaked, not dotted, limbs ; differing from the latter in the possession of red lines in the white bands. This form also resembles *H. melanoleucus* Laurent, but differs in the absence of ventral markings, and a smaller size. It is most closely related to *H. marmoratus taeniatus* Peters, with which it intergrades. It differs from *m. taeniatus* in having fewer and narrower white bands.

Description of holotype.—Canthus rostralis rounded and concave, snout truncate. Internarial distance slightly more than distance from nostril to eye, slightly more than $\frac{2}{3}$ interorbital distance. Webbing reaching distal subarticular tubercle of fourth toe on both sides. Skin smooth above, granular below.

Dorsal markings : A regular white band extending from the tip of the snout to above the vent, and a lateral white band extending from behind each eye to near the groin, becoming irregular posteriorly. A continuous red line is contained within each white band, running along the midline. Remainder of back black. Upper leg without markings, but tibia with heavy black vermiculations and red streaks and spots. Arms with black blotches and red spots. An immaculate pinkish-white ventrally.

Dimensions : Distance from snout to vent 29·8 mm., width of head 9·9 mm., length of hind limb 43·4 mm.

Paratypes.—The paratypes are divisible into two series, the one consisting of 21 males and 3 females, having markings similar to the holotype, while the other series, consisting of 8 males, shows an almost uniform brown dorsal coloration, with scattered orange to red spots or stripes. In the specimens marked similarly to the holotype, the red lines may be continuous, or else broken up into a number of separate lines. The ground colour varies from dark green to black.

The specimens were collected in a reed bed at Fern Valley, Umtali, where this form was calling in great numbers.

Other material.—Eighty-four specimens examined from Mtoko, Mazoe, Mt. Hampden, Salisbury, Chisawasha, Inyanga, Nyamaziwa, Pungwe River Gorge, Penhalonga, Driefontain, Somabula ; all localities on the Southern Rhodesian highveld.

This form is so named as a tribute to the work of Mr. D. G. Broadley, Curator of Herpetology at the Umtali Museum, who has contributed more to our knowledge of Southern Rhodesian herpetology than have all earlier workers put together.

Rana wageri Wager.

Rana wageri Wager, 1961, *African Wild Life*, **15**, p. 151, figs.

Although Wager had no intention of naming this form, his article in *African Wild Life*, **15**, publishes the name *Rana wageri* for the first time, and satisfies

Article 13 (i) of the International Code of Zoological Nomenclature (1961), for the name is accompanied by statements giving characters which differentiate the species. This constitutes a valid naming of the species as *Rana wageri* Wager. Although, as Wager has stated, the name was proposed by me, I had not validated this name in print before Dr. Wager's article was published. Types of this form are now designated, and a more definitive description given.

I am grateful for the opinions of Dr. L. D. Brongersma and Dr. L. B. Holthuis, of the Rijksmuseum van Natuurlijke Historie, Leiden, on the question of nomenclatural procedure in this species.

Types.—Holotype : an adult male deposited in the Natal Museum (NM 1145) collected at Weza Forest Reserve, southern border of Natal, at about 5,500 ft. (1,680 m.) by Dr. V. A. Wager in April 1960. Paratypes : four adult males and one female, bearing the same records as the holotype.

Description of holotype.—Omosternum forked posteriorly. Procoracoid-clavicular bars (staining with alizarin) very well developed, forming strong transverse bars. Vomerine teeth in oblique series between choanae.

Width of head 0·35 times body length. Head tapering from level of tympanum, width of skull at level of nostrils greater than distance from nostril to posterior corner of eye. Internarial distance greater than interorbital distance, greater than distance from nostril to eye. Horizontal diameter of tympanum less than distance from eye to nostril. Tip of snout rounded. Tibiotarsal articulation passing snout, length of tibia more than half body length. One phalanx of fourth toe free of web. Outer metatarsals separated, inner metatarsal tubercle compact and small, length equalling length of proximal phalanx of inner toe.

Ground colour in formalin greyish. No dark spots on the back, but back somewhat freckled with darker markings. Top of snout lighter than rest of back, division being clearly marked by an interocular margin. A very prominent dark band running from nostril to eye, and passing over tympanum to near base of forearm. Upper lip with a dark band, lower lip marbled. Entire ventral surface immaculate silvery white.

Dorsal skin with numerous fine, pointed, granular asperities.

Dimensions : Distance from tip of snout to vent 38·7 mm. ; width of head 13·4 mm. Distance from vent to tip of fourth toe 81·2 mm. ; length of tibia 25·2 mm.

Paratypes.—The series shows considerable variation in the extent of the posterior notch in the omosternum. The condition of the holotype is about intermediate. An asymmetrical bony tongue is developed in the notch, which in one specimen almost completely fills it.

The paratypes resemble the holotype in their markings, although in one specimen there is a thin light vertebral line extending from the scapular region to near the tip of the urostyle. According to Dr. Wager, in life these specimens

were coloured a uniform yellow, brick red or brown. The distance from the snout to the vent ranges from 41·5 to 38 mm. in the males ; the length of the female is 46 mm.

Other material.—An adult male collected by Dr. V. A. Wager from Giant's Castle, Natal Drakensberg : body length 39·8 mm. Also a 39 mm. male in the Albany Museum from Sabie, Transvaal Drakensberg.

Hyperolius horstocki (Schlegel).

Hyla Horstockii Schlegel (part), 1837, *Abbildungen*, p. 24 : " Vorgebirge der guten Hoffnung ", *i.e.* Cape of Good Hope.
Eucnemis Horstokii Tschudi, 1838, *Classif. Batr.*, *Mem. Soc. Sci. nat. Neuchatel.*, **2**, p. 35 : " Festeland von Afrika ".

For over a century, uncertainty has existed in the literature as to the author of the name *Hyperolius horstockii* (or *horstokii*). The name has usually been ascribed to Schlegel, but other authors, including most of the earliest, ascribe the name to Tschudi. The problem, however, has never been reviewed. The present author has had the benefit of examining the original material and of discussing this problem with Drs. L. D. Brongersma, L. B. Holthuis and M. Boeseman, of the Rijksmuseum van Naturlijke Historie, Leiden, whose invaluable help is here gratefully acknowledged.

The name first appeared in the literature in Schlegel's *Abbildungen* (1837). In a discussion of tree-frogs (" Laubfrösche "), Schlegel remarks that Africa is poor in these forms : " da man bis jetzt im nördlichen Theil dieser grossen Halbinsel (*i.e.* Africa) noch keinen Laubfrosch beobachtet hat, und da die einzige Art, welche am Vorgebirge der guten Hoffnung vorkommt, wegen ihrer Seltenheit den Untersuchungen der meisten Naturforscher entgangen ist " (p. 24). In a footnote following this passage, Schlegel adds, " Diese neue Art, von welcher man bei Seba I. 73, 3 eine Abbildung findet, ist im königl. Museum, ihrem Entdecker zu Ehren *Hyla Horstockii* genannt worden ". There can be no doubt that by " Diese neue Art ", Schlegel was referring to specimens of " *Hyperolius horstockii* " housed in the Rijksmuseum van Natuurlijke Historie, bearing the locality " Kaap de Goede Hoop ", collected by H. B. van Horstock and numbered RMNH 1775. The reference to Seba's figure validates the name. However, Seba's figure does not in fact resemble the Cape material, and is actually an illustration of a South American frog that Seba himself called " *Rana, Brasiliensis, gracilis* ". Schlegel obviously made an error of judgement when he considered that van Horstock's material and Seba's figure represented the same form. This being the case, *horstockii* Schlegel must be regarded as a composite species, being in part the Cape tree-frog, and, due to an error of judgement, in part the South American frog figured by Seba. Consequently *Eucnemis horstokii* Tschudi has to be regarded as an objective synonym of *Hyla horstockii* Schlegel (part), as it is also based on van Horstock's material. Tschudi (p. 76) does in fact indicate this synonymy.

Types.—As other forms have been confused with *horstocki*, the author has selected a lectotype from the three syntypes catalogued as RMNH 1775, and a description of this specimen follows. This lectotype is now the only specimen numbered 1775. The remaining two specimens are paralectotypes, and are now numbered RMNH 10770.

Description of lectotype.—Canthus rostralis rounded and straight, snout fairly pointed. Internarial distance subequal to distance from nostril to eye ; less than interorbital distance. Tibio-tarsal articulation reaching just beyond eye. Tips of fingers and toes with expanded, flattened discs. Webbing reaching distal subarticular tubercle of outer finger ; just reaching distal subarticular tubercle on outer side of fourth toe, reaching middle tubercle on inner side. Skin smooth above.

A uniform putty colour above. On each side a dark brown canthal streak, continuing backwards from eye above tympanum to groin, bordered by a light margin above. A fainter dark streak running from below tympanum parallel to the upper streak, almost to groin. Lower streak bordered below by a light margin in the region of the forearm. Area between the two streaks slightly darker than the back. Limbs without markings.

The specimen, which is a female, has a length from the tip of the snout to the vent of 40·5 mm.

Paralectotypes.—A female with a length of 33 mm., and a male with a length of 23·9 mm. Both specimens closely resemble the lectotype.

References

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EXPLANATION OF PLATE

Illustrating Dr. J. C. Poynton's paper, " Descriptions of Southern African Amphibians."

Fig. 1.—*Nothophryne broadleyi* sp. nov. Dorsal aspect of holotype. ×1.

Fig. 2.—*Nothophryne broadleyi* sp. nov. Ventral aspect of holotype. ×1.

Fig. 1.

Fig. 2.

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